# ARIES
## HIGH PURITY WATER SYSTEM

# Operation & Maintenance Manual

Version 1.1a

Thank you for purchasing the ARIES High Purity Water System. For optimum performance and safety please read and follow these instructions carefully.

You have a quality, world class water treatment system that will provide ultrapure water for many years of trouble free operation. Years of engineering and practical experience went into manufacturing this appliance which will dispense Ultra High Purity Water. To assure that you operate and maintain this unit properly and safely please read this manual carefully.

In order that we may keep you informed regarding your unit, please take a moment to complete and mail the owner registration card provided with this appliance.

If you have any questions concerning the operation of the unit, or need service, refer to section 11.0 "REQUESTING SERVICE". When requesting service you will need the model and serial number, as well as the purchase date of your unit and the name of the dealer you purchased it from. For your convenience record this information below:

Model Number: _____ Date: _____

Serial Number: _____ Dealer: _____

Contact: _____ Phone: _____

Cartridge #1 _____ Part Number _____

Cartridge #2 _____ Part Number _____

Cartridge #3 _____ Part Number _____

Options Installed: _____

_____

_____

*ARIES FilterWorks, a division of ResinTech, Inc. * 160 Cooper Road * West Berlin, NJ 08091*
*Phone: (856) 768-9600 * Fax: (856) 768-9601 * www.arieswater.com*

# Table of Contents


| Section | Description |
|---|---|
| 1.0 | Important Safeguards |
| 2.0 | Glossary of Terms |
| 3.0 | General Description |
| 3.1 | Principles of Purifying Water |
| 4.0 | Product Specifications |
| 5.0 | Before Using Your Dispenser |
| 5.1 | Setup |
| 5.2 | Installing the Cartridges |
| 5.3 | Startup Procedure |
| 5.4 | Initial Polishing of new cartridges |
| 6.0 | Display & Keypad Functions |
| 7.0 | Maintenance |
| 7.1 | Changing the UV lamp |
| 7.2 | Replacing the Filter Cartridges and Final Filter |
| 8.0 | Sanitization |
| 9.0 | Options and Accessories |
| 10.0 | Requesting Service |
| 11.0 | Trouble Shooting Guide |
| 12.0 | Charts and References |
| 13.0 | Warranty |

# 1.0 Important Safeguards

When using this electrical appliance, basic safety precautions should always be followed including the following:

- READ ALL INSTRUCTIONS before use.
- Follow all ***WARNINGS*** and ***INSTRUCTIONS*** marked on the product.
- ***DO NOT*** immerse appliance in water or other liquid. Use a soft cloth and mild detergent when cleaning the unit.
- ***DO NOT*** remove the exterior covers with unit power applied.
- ***DO NOT*** remove the ultraviolet lamp (if installed) with unit power applied.
- ***DO NOT*** look directly at the ultraviolet lamp (if installed) with unit power applied.
- ***DO NOT*** operate any appliance with a damaged or frayed power cord. To disconnect the power cord, grip the plug and pull it from the wall outlet, ***NEVER PULL ON CORD!***.
- ***DO NOT*** use this appliance outdoors. This appliance is intended for commercial, industrial, institutional, and professional use. Use of this product in a manner other than recommended herein, may void the warranty.
- **DO NOT** operate this appliance without it being connected to an adequate water supply and purged of air or damage to the pump may occur.
- ***DO NOT*** allow the cord to hang over the edge of a counter top or to touch hot surfaces. NOTE: If an extension cord is used, verify that the rating of the extension cord is equal to or greater than the rating of the appliance.
- Refer servicing of a defective or damaged unit to the factory or an authorized dealer.
- The use of attachments not recommended by the manufacturer may adversely affect the water purity or cause appliance damage and void its warranty.
- Avoid contacting the dispensing outlets with any foreign materials or hands to prevent contaminating them.

# 2.0 GLOSSARY of TERMS

The following terms are used throughout this text. Please take a few moments to familiarize yourself with them so that the information and instructions within are clear.

| TERM | DESCRIPTION |
|---|---|
| ***LED*** | Light Emitting Diode, is a semiconductor indicating device used for the status indicators on the operator control panel of this unit. |
| ***LCD*** | Liquid Crystal Display, is a semiconductive display device used in the operator control panel of this unit. |
| ***TOC*** | Total Organic Carbon. The identification of organic carbon in water is helpful to assure successful water system operation. Trace organic chemicals can interfere with highly sensitive reactions and alter biological processes. |
| ***TDS*** | Total Dissolved Solids conduct electricity. This conductivity allows you to measure the concentration of salts directly in parts per million (ppm). Higher TDS increases the load on the deionizing cartridges. |
| ***SDI*** | Silt Density Index, is a scale for determining the amount of suspended solids in water that exceed 0.45 microns in size. A regulated flow is passed through a 0.45 membrane and the flow, time, and pressures are plotted to arrive at the index number. Higher SDI numbers result in premature fouling of resin and filters. |
| ***HPC*** | Heterotrophic Plate Count, formerly known as the standard plate count, is a procedure for estimating the number of live heterotrophic bacteria in water and measuring changes during water treatment and distribution. |

## 3.0 GENERAL DESCRIPTION

This ultrapure water dispensing system has been engineered to consistently produce Type I ultrapure water. The system is user-friendly, requires minimal space and maintenance, and harmonizes with existing laboratory equipment, all at a low initial investment and low operating cost.

A central dispensing station can supply the high quality water needs of one lab bench or an entire laboratory. The system may be free standing or wall mounted where bench space is limited.

A continuously cycling recirculation pump polishes the water assuring the highest quality water is always available, and a high resolution digital monitor is built-in for continuous display of water purity.

A timer controller operates the recirculation pump, solenoid valve and resistivity meter. Bright LED's let you monitor overall system performance at a glance. The quick connect cartridge system makes replacing filters a simple task.

For optimum performance the Aries High Purity Water System may require reverse osmosis, distillation, or deionizing pretreatment. The feed water quality will determine the necessary pretreatment, if any. Optional pretreatment systems are available to operate from tap water that does not meet feed water specifications.

## 3.1 PRINCIPLES OF PURIFYING WATER

- Mixed Resins are used for polishing purity levels from pre-treated, filtered, RO, distilled, or DI water to a maximum of 18.17 megohms resistivity.
- .2 micron final filter for Bacteria removal.
- Timer Controller runs system automatically for 30 minutes every 2 hours to keep bacterial from blooming.
- WAKE Button interrupts system standby to start 30 minute run cycle.
- A high resolution digital purity monitor displays the ionic purity of the treated water in Megohms to two decimal places. The user never has to guess how pure the water is. The built-in pump will recirculate the water for the highest available purity.
- Optional Ultraviolet Irradiation is used for organic reduction & bacterial reduction
- Optional .05 micron absolute filter for pyrogen reduction.

# 4.0 PRODUCT SPECIFICATION

## Design Features:

- 1.8 lpm flow with final filter
- 3.7 lpm Flow without final filter
- Exceeds 18 Megohm Type I Water
- Timer Control polishing cycle
- Digital Purity Monitor (standard)
- Natural FEP, ABS and Polypro Fittings & Tubing to Prevent Contaminants
- & Leaching.
- Silent Magnetic Drive Polishing Pump
- UV Protected Dispensing Nozzle
- Quick Connect cartridges require no tools to replace.
- Three cartridges.

## Options & Accessories:

- 220 volt Operation with external transformer
- UV Combination for Bacteria and TOC
- Wall Mounting Kit
- Reverse Osmosis Pre-treatment Packages
- Re-circulating Spray Gun
- 0.05 micron Pyrogen removal filter

## Typical Applications:

Media Prep
Tissue Culture
Glass Wash
DNA/NRA testing
Liquid & Ion Chromatography
Atomic Absorption

## Physical Properties:

| | |
|---|---|
| Dimensions (WxHxD): | 20" x 25" x 7 _" |
| | 50.8 cm x 63.5 cm x x18.4 cm |
| Weight: Shipping | 23 lbs (10.4 Kg) |
| Wet | 43 lbs (19.5 Kg) |
| Power Requirements: | 115vac, 60hz, |
| | [230 vac 50 hz available] |

## Feed Water Requirements:

Reverse osmosis, distillation or deionization quality or tap water that meets the following:

| | |
|---|---|
| Conductivity: | < 150 uMhos |
| TOC: | < 100 ppb |
| Silt Density Index: | < 2 |
| Pressure: | 20 - 50 psi [1.4-3.5 bar] |
| Connection: | 3/8"OD tube |
| Temperature: | < 80°F (< 27°C) |

## Treated Water:

| | |
|---|---|
| Dispense flow: | up to 3.7 lpm [1 gpm] |
| Purity: | > 18 M_/cm |
| Temperature rise: | < 5°c [9°F] above feed |

# 5.0 BEFORE USING YOUR DISPENSING SYSTEM

This section includes instructions for initial installation and start-up of the unit. Described herein are selection of unit location, unit unpackaging, and connection of unit to the water and electrical supplies. Also described are cartridge installation, purging of trapped air, and initial flush.

## 5.1 Setup

- Select a location for the unit which is in close proximity to the water supply and electrical supply connections. If the unit has been purchased with the *WALL MOUNTING* option, select a wall which will support a 55 pound load on 16 inch stud centers or provide wall backing material.
- If the water supply does not already have an isolation valve for servicing the ARIES, install one ahead of the unit connection.
- Carefully remove all of the packaging material and tape used for shipping purposes, and position the unit in its operating location.
- Install the nipple and right angle valve into the unit outlet
- Install the final filter into the outlet valve.
- Using the tube fittings provided with the unit, connect the unit inlet to the water supply.
  ***( DO NOT open the supply isolation valve at this time.)***

## 5.2 Installing the Cartridges

- There are three (3) cartridge positions. The water flows from left to right. Any pretreatment filters must be installed in position #1 (furthest from the display) and a polishing filter must be installed in position #3 (closest to the display).
- Locate the water purifying cartridges selected for your system. Unwrap the filters, remove the shipping plugs and affix the labels.
- Place the large opening at the bottom of the filter onto the plunger. Push the cartridge down and tilt back until the filter is aligned with the top post. Allow the filter to slide up over the upper fitting and gently rotate left and right to insure a good seal with the top and bottom O-rings.
- Repeat above procedure for filters #2 and #3.
- Filters should always be installed in the 1,2,3 order and removed in reverse – 3,2,1.

## 5.3 Start up procedure

- Plug in the unit. The electrical outlet should be properly grounded and fused.
- Open Outlet valve and place a container underneath
- Slowly turn on the water supply to the unit and correct any leaks at the supply connections.
- Turn unit on at the power switch and allow water to flow. Water will be visible filling the cartridges upflow from the left to the right. Allow the air to bleed from the system thought the outlet valve and into the container.
- When all air has been purged from the system close the outlet valve and the system will run normally.
- Check connections and cartridges for leaks.

5.4 "INITIAL POLISHING" of New Cartridges

- Cartridge may require up to 24 hours to rinse up to 18.17 Megohms.
- 4 liters of water should be run thought the filters as an initial purge of the system
- We recommend a sample be collected in an appropriate sterile sample container and tested for water purity. Periodic laboratory water testing to confirm the effectiveness of the treatment process is the owners' responsibility.

## 6.0 DISPLAY AND KEYPAD FUNCTIONS

Be sure you understand the function of each button before using them.

- **Function Keys:**

***WAKE*** Wakes the unit up form the Stand By mode and initiates the 30 minute polishing cycle.

***(NOTE: The Wake key must be pressed longer than 1/2 second or unit will not wake up.)***

**POWER** Turns on the power, starts the timer controller

**STAND BY** Amber LED is on when the unit is in Stand By mode. Solenoid, pump and meter are powered down.

**POLISHING** Green LED is on when the unit is running, Solenoid, pump and meter are on.

- ***Resistivity Meter – Refer to the separate Model 414R-HP manual***

# 7.0 MAINTENANCE

This unit was designed and manufactured to have the ability to produce the purest water that can be obtained for laboratory usage. It purifies water that meets or exceeds the specifications recommended by CAP, ASTM, for Type I Reagent Grade Water when it is operated and maintained according to these instructions.

- The ultraviolet lamp (if installed) must be changed once each year.
- The resin cartridges must be replaced when the purity meter indicates the water purity is below your requirements *or every 6 months*.
- The exterior surfaces may be wiped clean with a mild detergent and a soft cloth to keep the unit clean and new looking.

## 7.1 Changing the UV Lamp

**WARNING!! ELECTRICAL SHOCK HAZARD**

Before removing the top cover, disconnect the power cord. **FAILURE** to do so could result in electrical shock or personal injury.

Hold the UV lamp by the plastic ends ***ONLY.*** ***DO NOT*** touch the glass. Finger prints and oils from your hands will etch the glass and reduce UV life & performance.

If the lamp should become oily or dirty, clean it with a clean soft tissue or cloth wetted with isopropyl alcohol.

- It is not necessary to turn off the water supply to replace the lamp.
- The UV lamp may be turned off by switching the POWER switch to the off position.
- Remove the top cover by removing the phillips head screws that attach it. Gently lift the top cover up and left, and set it aside.
- Unclasp the clamps that hold the stainless steel body of the UV light. Gently lift the body up about 2 inches to allow clearance for bulb removal.
- Pull gently on the bulb socket to disengage the wire from the bulb. Slide the old bulb out of the UV body and discard.
- Grasp the new UV lamp by the plastic end and slide it inside the body making sure the 4 contact prongs stick out of the unit. Re-attach the bulb socket and wire making sure that the contacts seat firmly into the socket.
- Gently push UV body back into the bracket. Squeeze clamps until the click firmly about the UV body
- Replace the top cover and turn the unit on.

7.2 Replacing the Filter Cartridges and Final Filter

The cartridges are expendable items which have a finite capacity to deionize and polish the water. When the digital display indicates the purity is less than your minimum requirements, the DI resin cartridges have exhausted their capacity to perform. Cartridge should be replaced *every 6 months* as a matter of routine maintenance. The final filter should be changed every time the cartridges are replaced

- Turn the unit off using the power switch.
- Open the outlet valve and leave open to purge any excess pressure. Use a container to catch any water that may splash from the outlet.
- Place a wad of paper towels around each plunger to absorb the small amount water that will come out of the filters, plungers and/or upper fitting.
- Remove the three cartridges starting with Cartridge #3. Push down on the cartridge gently and tilt forward. Quickly remove the filter and discard in the trash. There will be some residual water inside the filter. Water will come out the outlet valve (still open) when the cartridge is depressed.
- Remove cartridge's #2 and #1 in this order using the same procedure above. When the plunger is depressed some water will come out of the upper fitting next to the filter.
- Dry the unit and replace the cartridges as described in Section 5.2, Installing the Cartridge.
- The used cartridges may be disposed of in the same manner as any water filter cartridge.
- Replace the Final Filter with a new one each time the filter cartridges are replaced.

## 8.0 SANITIZATION

See Sanitization Kit for instruction. Sold Separately.

# 9.0 OPTIONS and ACCESSORIES

The following options & accessories are supplied as kits and include detailed instructions for assembly onto the basic design

The use of attachments or accessories not approved by this manufacturer may adversely affect the water purity or cause appliance damage and void the warranty.

For questions regarding these and other options & accessories that may be available for system specific needs, or for components to aid installation, please contact an authorized dealer in your area or contact the factory.

***FOR CARTRIDGES – USE ARIES FILTERWORKS VP SERIES CARTRIDGES***

**9.1 220 Volt Operation (HPA-008)**

The ARIES can be made to operate on 220 Volt 50/60 hz version with the addition of an external step down transformer..

**9.2 Wall Mounting Bracket (N/A)**

Where counter space is limited, a ***Wall Mounting Bracket*** is available to support the ARIES Unit from any wall that can support a 55 pound load on two 16 inch centers. Note: Depending on materials of wall construction, backing material may be required.

**9.3 ARIES HPL-RO, Reverse Osmosis Pretreatment Package (HPL-RO)**

When available feed water quality fails to meet the minimum requirements pretreatment with Reverse Osmosis will increase ultimate water purity and increase cartridge life. Consult ARIES Filter Work or you water treatment dealer for further information.

**9.4 Aries HPL-RO Replacement Cartridge Kit (AFK-005)**

Replacement cartridge kit includes (1) 5.0 micron prefilter, (1) GAC carbon filter, and (1) 1.0 micron post filter

**9.5 Aries HPL-RO Replacement Membrane (AM-12-7010)**

Replacement membrane is a thin film composite PA membrane with 100 GPD output.

**9.6 Combination UV system for Bacteria and TOC Reduction (HPA-002)**

Ultraviolet light system with a combination of 185 nm and 254 nm wavelengths for bacteria sterilization and total organic carbon (TOC) reduction.

**9.7 Replacement Bulb for Combination UV system (HPA-003)**

Replacement bulb with 4 pin connection. Dual wavelength bulb.

**9.8 Replacement pump for Aries System (1200103)**

110 VAC pump with _” MNPT connections

### 9.9 Recirculating Spray Gun with Recirculation (HPA-001)

When remote dispensing or spraying of high purity DI water is a requirement, a Hand Dispense/Spray Gun Kit is available for the ARIES. This spray gun incorporates a unique recirculation system to provide a continuous rinse of ultrapure water through it. Installation is simple with coiled tubing for maximum flexibility. A threaded gun tips allows for installation of a final filter.

### 9.10 Bacteria final capsule filter, 0.2 Micron (PF-00-6402)

0.2 micron absolute rated final capsule filter. _" MNPT x _" hose barb connection. Includes filling bell.

### 9.11 Pyrogen removal Final Filtration, .05 Micron (PF-00-6505-HN)

0.05 micron absolute rated final ultrafilter – hollow fiber. _" MNPT x3/8" hose barb connection.

### 9.12 Blank Sanitization Cartridges (VP-17-0000)

Blank VP Style cartridges for sanitization of unit. (3) required per Aries System. Sanitization kit sold separately.

## 10.0 REQUESTING SERVICE

Before calling the factory to request service, search the troubleshooting guide below for symptoms which your unit exhibits, and verify the cause and possible remedies listed. If your symptom is not listed, or the remedy does not provide a cure, Contact:

ARIES FILTER WORKS
160 Cooper Road
West Berlin, NJ 08091
Phone: (856) 768-9600
Fax: (856) 768-9601
www.arieswater.com
Email: aries@resintech.com

and ask for a customer service representative.

Be prepared to provide the representative with the model number, serial number, date of purchase and any options that may have been purchased with or added to the unit after purchase (as recorded on page (1) of this manual.

Next be prepared to describe to our service representative the symptoms that the unit exhibits.

# 11.0 TROUBLESHOOTING GUIDE

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| Unit will not WAKE up | Wake button pushed too quickly. | WAKE button must be pushed at least _ second to initiate the polishing mode. |
| Display is off. | No power to the unit or unit in Stand By mode. | Check the unit is plugged into a live outlet.<br>Check the unit's fuse - replace it if it is blown.<br>Press the Wake switch to initiate the polish cycle |
| Unit blows fuses. | An electrical short exists in the unit. | Return the unit to the factory for repairs or have unit serviced by an authorized dealer. |
| Unit will not dispense water. | Supply water is not on.<br>Bad Solenoid.<br>A filter cartridge is loaded with particles and plugged.<br>No flow | Confirm that the supply water is turned on.<br>Have unit serviced by an authorized dealer or return to factory<br>Replace the filter cartridge.<br>Capsule filter is bound with air. Open bleed valve |
| Display indicates water purity is below set point. | The supply water is improperly treated.<br>The resin cartridges are not seated.<br>Resin is exhausted. | Test the supply water TDS add additional treatment.<br>Open cartridge housing and reseat cartridge.<br>Install fresh cartridges. |
| Resin cartridges exhaust quickly. | The supply water is improperly treated. | Test the supply water TDS. Add additional pretreatment to obtain higher quality. |
| Sub-micron filter plugs rapidly. | The supply water has colloids and is improperly treated. | Perform a Silt Density Test. If it is higher than 1 add additional pretreatment. |

# 12.0 REAGENT GRADE WATER

| | CAP | | | ASTM | | | | NCCLS | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Type I | Type II | Type III | Type I | Type II | Type III | Type IV | Type I | Type II | Type III |
| Specific Conductance (micromho/cm., max) | 0.1 | 0.5 | 10 | 0.06 | 1.0 | 0.25 | 5.0 | 0.1 | 0.5 | 10 |
| Specific Resistance (megohms-cm, min) | 10 | 2.0 | 0.1 | 18.0 | 1.0 | 4.0 | 0.2 | 10 | 2.0 | 0.1 |
| pH @ 25_ C (*) | * | * | 5.0<br>8.0 | * | * | *<br>* | 5.0<br>8.0 | * | * | 5.0<br>8.0 |
| Silicate, Soluble (Ig/L, max) | 50 | 100 | 1000 | 3.0 | 3.0 | 500 | N.L. | 50 | 100 | 1000 |
| Culture/Colony Count cfu/mL (**) | 10 | 10^3 | | ** | ** | ** | ** | 10 | 10^3 | |
| Total Organic Carbon (TOC), max, Ig/L | | | | 100 | 50 | 200 | N.L. | | | |
| Sodium, max, Ig/L | | | | 1.0 | 5.0 | 10 | 50 | | | |
| Chlorides, max, Ig/L | | | | 1.0 | 5.0 | 10 | 50 | | | |

Note: CAP = College of American Pathologists
ASTM = American Society for Testing and Materials
NCCLS = National Committee for Clinical Laboratory Standards
EU = Endotoxin Units
N.L. = No Limit
* : The measurements of pH in Type I, Type II and Type III reagent water is meaningless and has been eliminated from the procedure, since the electrodes used in this test contaminate the water.
** : When bacteria levels need to be controlled, reagent grade types should be further classified as follows: Microbiological contamination: Max heterotrophic bacteria count Type-A 10/1000 mL, 0.03 EU, Type-B 10/100 mL, 0.25 EU, Type-C 100/10 mL.

References : CAP Reagent Water Specifications, 1985, pg 5, 11.
NCCLS Document C3-A2, Vol. 11, No. 13, Pg 8.
Annual Book of ASTM Standards, 1992, Vol. 11.01, D1193-91, Pg 45.

## 13.0 WARRANTY

Systems and options have a one-year warranty from the date of purchase. If any component fails to function normally within the first year, return the unit to the factory prepaid. If in the opinion of the factory, failure was due to defects in materials or workmanship, repair or replacement will be made without charge. A reasonable service charge will be made for diagnosis or repairs not covered by this warranty. ARIES / ResinTech, Inc.assumes no other responsibility or liability.

This warranty does not cover any product which has been subject to misuse, neglect, accident or used in violation of operating instructions nor does it extend to any units altered or repaired for warranty defects by anyone other than ARIES / ResinTech, Inc.

IN NO EVENT SHALL ARIES / RESINTECH, INC. BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT, PUNITIVE OR EXEMPLARY DAMAGES OR LOST PROFITS FROM ANY BREACH OF THIS WARRANTY OR OTHERWISE.

ARIES / ResinTech, Inc., reserves the right to make changes in design, specifications and prices without notice.